IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of BERNARD GLEICH	Atty. Docket DE 030116
	Confirmation No. 5535
Serial No. 10/552,806	Group Art Unit: 1631
Filed: OCTOBER 11, 2005	Examiner: DEJONG, ERIC S.

Title: METHOD OF DETERMINING STATE VARIABLES AND CHANGES IN STATE VARIABLES

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United States Patent and Trademark Office
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APPEAL BRIEF

Sir:

Appellant herewith respectfully presents a Brief on Appeal as follows, having filed a Notice of Appeal on May 18, 2010:

REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee of record Koninklijke Philips Electronics N.V., a corporation of The Netherlands having an office and a place of business at Groenewoudseweg 1, Eindhoven, Netherlands 5621 BA.

RELATED APPEALS AND INTERFERENCES

Appellants and the undersigned attorney are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-3, 5-17, 19 and 41-42 are pending in this application, where claims 4, 18 and 20-40 are canceled. Claims 1-3, 5-17, 19 and 41-42 are rejected in the Final Office Action mailed in February 19, 2010. This rejection was upheld in an Advisory Action that mailed May 11, 2010. Claims 1-3, 5-17, 19 and 41-42 are the subject of this appeal, (and NOT claims 1-19, 41 and 42, as incorrectly noted in the Final Office Action and the Advisory Action, since claims 4, 18 and 20-40 had been canceled without prejudice).

STATUS OF AMENDMENTS

Appellants filed on April 7, 2010 an after final amendment in response to a Final Office Action mailed on February 19, 2010. The after final amendment not included minor amendments to the specification and claims. In an Advisory Action mailed on May 11, 2010, it is indicated that the after final amendment filed on April 7, 2010 will be entered and does not place the application in condition for allowance. This Appeal Brief is in response to the Final Office Action mailed February 19, 2010, that finally rejected claims 1-3, 5-17, 19 and 41-42, which remain finally rejected in the Advisory Action mailed on May 11, 2010.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention, for example, as recited in independent claim 1 and shown in FIGs 1-3, and described on page 3, line 25 to page 4, line 19, and page 5, line 13 to page 6, line 21 of the specification, is directed to a method of determining physical, chemical and/or biological state variables in an examination area of an examination object by determining a change in a spatial distribution of magnetic particles in the examination area, the method comprising the acts of introducing into the examination area magnetic particles in a first state or in a second state wherein, in the first state, at least some of the magnetic particles that are to be examined are agglomerated and/or coupled to one another and wherein, in the second state, the particles are deagglomerated and/or decoupled; generating a magnetic field having a strength with a spatial profile such that there is produced in the examination area two part-areas including a first part-area having a low magnetic field strength and a second part-area having a higher magnetic field strength than the low magnetic field strength; changing spatial positions of the two part-areas in the examination area or changing the magnetic field strength in the first part-area to cause the change in the spatial distribution of magnetic particles so that magnetization of the particles is locally changed; detecting signals that depend on the magnetization in the examination area that is influenced by the changing act; and evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and about

physical, chemical and/or biological state variables, wherein the physical, chemical and/or biological state variables include at least one of substance concentration, temperature, pressure, viscosity and pH. As described on page 8, line 32 to page 9, line 6, the method further includes correlating the change in the spatial distribution of the magnetic particles in the examination area with at least one of a local concentration, temperature, pressure, viscosity and pH value.

The present invention, for example, as recited in dependent claim 41, and shown in FIGs 1-3, and described on page 6, lines 4-21 of the specification, is directed to a method where changing the magnetic field strength changes the magnetic field strength temporally in a first frequency band, and detecting signals includes detecting the signal in a second frequency band, the second frequency band including harmonics of signals in the first frequency band.

The present invention, for example, as recited in dependent claim 42, and shown in FIGs 1-3, and described on page 7, line 11 to page 8, line 7 of the specification, is directed to a method where generating the magnetic field includes the act of first and second magnetic fields which change at different rates and with different amplitudes, and where the

first magnetic field changes slowly in time and with a higher amplitude relative the second magnetic field, and the second magnetic field changes rapidly in time terms and with a lower amplitude relative the first magnetic field.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-3, 5-17, 19 and 41-42 (and NOT claims 1-19, 41 and 42, since claims 4, 18 and 20-40 had been canceled without prejudice) of U.S. Patent Application Serial No. 10/552,806 are unpatentable under 35 U.S.C. §103(a) over a publication entitled "A brief review of parallel magnetic resonance imaging", (Heidemann) or a publication "Anisotropic Water Diffusion in Macroscopically Oriented Lipid Bilayers Studied by Pulsed Magnetic Field Gradient NMR" (Wasterby) in view of a publication "Rotational Viscosity, Dynamic Phenomena, and Dielectric Properties in a Long-Chain Liquid Crystal: NMR Study and Theoretical Treatment" (Zahharov).

ARGUMENT

Claims 1-3, 5-17, 19 and 41-42 are said to be unpatentable over Heidemann in view of Wasterby and Zahharov.

Appellant respectfully requests the Board to address the patentability of independent claim 1, as well as dependent claims 41 and 42, and further claims 2-3, 5-17, 19 as depending from independent claim 1, based on the requirements of independent claim 1. This position is provided for the specific and stated purpose of simplifying the current issues on appeal. However, Appellant herein specifically reserves the right to argue and address the patentability of claims 2-3, 5-17, 19 at a later date should the separately patentable subject matter of claims 2-3, 5-17, 19 later become an issue. Accordingly, this limitation of the subject matter presented for appeal herein, specifically limited to discussions of the patentability of claims 1, 41 and 42 is not intended as a waiver of Appellant's right to argue the patentability of the further claims and claim elements at that later time.

At the outset, it is alleged that the present invention as recited in the claims "is so broadly constructed that it encompasses any and every NMR and MRI spectroscopic techniques that requires the use of spatial magnetic field gradient applied to spin 1/2 nuclei." (Final Office Action, page 3, last paragraph) Appellant strongly traverses and submits that independent claim 1 is specifically directed to a method of determining

physical, chemical and/or biological state variables in an examination area by determining a change in a spatial distribution of magnetic particles introduced in the examination area. Further, it is respectfully submitted that it is the rejection that is so broadly alleged, without any particular or specific location of the cited prior art being referred it except for the Abstract of Zahharov.

In the Final Office Action, Appellant requested twice that the specific locations by page and line numbers of where exactly are the so called broad features of the present invention are disclosed or suggested in the cited prior art references. No specific part of the cited references, except for the whole documents and the Abstract of Zahharov, is referred to for allegedly showing the so called broad features of the present invention. It is respectfully submitted that the lack of citation of particular or specific locations in the cited prior art is indicative that the cited prior art references do not disclose the features of the present invention.

It is respectfully submitted that the Board of Patent Appeals and Interferences has consistently upheld the principle that the burden of establishing a prima facie case resides with the Office, and to meet this burden, the Examiner must specifically identify where each of the claimed elements is found in the prior art.

Yet, in rejecting all 20 claims, namely, claims 1-3, 5-17, 19 and 41-42, only broad allegations referring to three whole documents are cited without any specific locations (except that there is a reference to the Abstract of Zahharov), in less than TWO pages in

the Final Office Action.

A careful inspection of the cited prior art reference reveal that none of them disclose or suggest "determining physical, chemical and/or biological state variables **in an examination area** of an examination object ... **introducing into the examination area magnetic particles** ... evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and about physical, chemical and/or biological **state variables**," as recited in independent claim 1.

In particular, Heidemann is directed to increasing the speed of magnetic resonance imaging (MRI) using parallel MRI or pMRI. Heidemann is solely concerned with obtaining images and there is no disclosure or suggestion in Heidemann of "introducing into the examination area magnetic particles," as recited in independent claim 1. In NMR and MRI spectroscopy, typically no magnetic particles are in introduced into an examination area; rather, properties or images of the examination area are obtained by analyzing whatever is already present in the examination area. In fact, introducing foreign particles may taint the analysis or imaging of whatever exists in the examination area.

Wasterby is directed to measuring the anisotropy of water diffusion in macroscopically oriented lipid bilayers. As in Heidemann, Wasterby does not disclose or suggest "introducing into the examination area magnetic particles," as recited in independent claim 1.

Zahharov is directed to estimating rotational viscosities and analyzing dielectric

properties in a long-chain liquid crystal using NMR relaxation theory. That is, Zahharov uses NMR exactly as it is intended, namely, to analyze properties of desired particles, such as particles or long-chain liquid crystal that already exist in an examination area. As in Heidemann and Wasterby, Zahharov is also completely silent and does not disclose or suggest "introducing into the examination area magnetic particles," as recited in independent claim 1.

Assuming, arguendo, that the long-chain liquid crystal (LC) of Zahharov are magnetic particles that are introduced into an examination area, then Zahharov merely analyzes properties of the very same LC/magnetic particles which are introduced in the examination area.

In stark contrast, the present invention as recited in independent claim 1, specifically recites "A method of determining physical, chemical and/or biological state variables **in an examination area** of an examination object ... **introducing into the examination area magnetic particles** ... evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and about physical, chemical and/or biological **state variables**." (Illustrative emphasis provided) That is, the properties of magnetic particles introduced into the examination area are not analyzed; rather it is clear from claim 1 that it is the properties of the examination area itself that are determined, namely, "state variables in an examination area," using magnetic particles introduced into the examination area.

In Zahharov, if it is deemed that the LC are equivalent to magnetic particles which are introduced in the examination, then it is the properties of the very same LC/magnetic particles (which are introduced in the examination area) that are determined, and NOT the properties or state variables in the examination area.

In summary, "determining physical, chemical and/or biological state variables **in an examination area** of an examination object ... **introducing into the examination area magnetic particles** ... evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and about physical, chemical and/or biological **state variables**," as recited in independent claim 1 is nowhere disclosed or suggested in Heidemann, Wasterby and Zahharov , alone or in combination. (Illustrative emphasis provided)

Accordingly, it is respectfully requested that independent claim 1 be allowed. In addition, it is respectfully submitted that claims 2-3, 5-17, 19 and 41-42 should also be allowed at least based on their dependence from independent claim 1.

Claim 41 specifically recites that "the act of changing the magnetic field strength changes the magnetic field strength **temporally in a first frequency band**, and the detecting act includes detecting the signal in a **second frequency band**, the second frequency band including harmonics of signals in the first frequency band." (Illustrative emphasis provided) Heidemann, Wasterby, Zahharov, and combination thereof, do not

even disclose or suggest using two frequencies, let alone disclosing or suggesting that the second frequency band includes "harmonics of signals in the first frequency band," as recited in claim 41.

Further, claim 42 specifically recites that "the act of generating the magnetic field includes the act of first and second magnetic fields which change at different rates and with different amplitudes, wherein the first magnetic field changes **slowly in time and with a higher amplitude** relative the second magnetic field, and the second magnetic field changes **rapidly in time terms and with a lower amplitude** relative the first magnetic field. Heidemann, Wasterby, Zahharov, and combination thereof, do not even disclose or suggest using two magnetic fields, let alone disclosing or suggesting that one magnetic field changes **slowly in time and with a higher amplitude**, and the other magnetic field changes **rapidly in time terms and with a lower amplitude**, as recited in claim 42.

In addition, Appellant denies any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. Any rejections and/or points of argument not addressed would appear to be moot in view of the presented remarks. However, the Appellant reserves the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the Examiner's statements are conceded.

CONCLUSION

Claims 1-3, 5-17, 19 and 41-42 are patentable over Heidemann, Wasterby and Zahharov.

Thus, the Examiner's rejections of claims 1-3, 5-17, 19 and 41-42 should be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

1.(Previously Presented) A method of determining physical, chemical and/or biological state variables in an examination area of an examination object by determining a change in a spatial distribution of magnetic particles in the examination area, the method comprising the acts of:

introducing into the examination area magnetic particles in a first state or in a second state wherein, in the first state, at least some of the magnetic particles that are to be examined are agglomerated and/or coupled to one another and wherein, in the second state, the particles are deagglomerated and/or decoupled;

generating a magnetic field having a strength with a spatial profile such that there is produced in the examination area two part-areas including a first part-area having a low magnetic field strength and a second part-area having a higher magnetic field strength than the low magnetic field strength;

changing spatial positions of the two part-areas in the examination area or changing the magnetic field strength in the first part-area to cause the change in the spatial distribution of magnetic particles so that magnetization of the particles is locally changed;

detecting signals that depend on the magnetization in the examination area that is influenced by the changing act;

evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and about physical, chemical and/or biological state variables, wherein the physical, chemical and/or biological state variables include at least one of substance concentration, temperature, pressure, viscosity and pH; and

correlating the change in the spatial distribution of the magnetic particles in the examination area with at least one of a local concentration, temperature, pressure, viscosity and pH value.

2.(Previously Presented) The method as claimed in claim 1, wherein the detecting act includes detecting change of the magnetic particles from the first state to the second state including deagglomeration and/or decoupling of coupled individual magnetic particles and/or detecting increased distance between individual magnetic particles.

3.(Previously Presented) The method as claimed in claim 1, wherein the detecting act includes detecting passage of the magnetic particles between the first state and the second state, the passage being due to at least one of heat, radiation, acid, base, electrical or magnetic fields, ultrasound and/ an enzyme.

Claim 4 (Canceled)

5.(Previously Presented) The method as claimed in claim 1, further comprising the act of spatially delimiting the agglomerated magnetic particles in a medium which can be physically, chemically and/or biologically modified, dissolved and/or degraded.

6.(Previously Presented) The method as claimed in claim 5, wherein the medium comprises polysaccharides, starch, in particular dextrins or cyclodextrins, waxes, oils, fats or gels.

7.(Previously Presented) The method as claimed in claim 5, the medium comprises microorganisms.

8.(Previously Presented) The method as claimed in claim 1, further comprising the act of providing the agglomerated magnetic particles on a surface of a particulate.

9.(Previously Presented) The method as claimed in claim 1, further comprising the act saturating the magnetic particles by application of an external magnetic field having a strength of about 100 mT or less.

10.(Previously Presented) The method as claimed in claim 1, wherein the magnetic particles multidomain or monodomain particles, and further comprising the act of reversing

the magnetization of the multidomain or monodomain particles by Neel's rotation and/ Brown's rotation.

11.(Previously Presented) The method as claimed in claim 1, wherein the magnetic particles are hard-magnetic or soft-magnetic multidomain particles.

12.(Previously Presented) The method as claimed in claim 1, wherein the magnetic particles are monodomain particles, or soft-magnetic multidomain particles of asymmetric shape, the method further comprising the act of reversing the magnetization of the monodomain particles by Neel's and Brown's rotation.

13.(Previously Presented) The method as claimed in claim 1, further comprising the acts of:

binding magnetic particles to functional binding units including at least one of a functional group, a DNA sequence, an RNA sequence, and an aptamer, and ; and

introducing into the examination area at least one compound which has complementary functional binding units including at least one of a complementary functional group, a complementary DNA sequence, a complementary RNA sequence, and a complementary aptamer sequence, that interacts in a binding manner with at least one functional binding unit of the magnetic particles.

14.(Previously Presented) the method as claimed in claim 1, wherein evaluating act further comprises the acts of:

selecting of a path for the movement of the first part-area having a low magnetic field strength within the examination area,

recording of reference data by using reference samples along the path at at least one location, and in the case of at least two locations, recording external parameters using at least a first receiving coil,

at least one of interpolating and extrapolating the recorded reference data recorded in respect of points and external parameters not recorded,

measuring the path within the examination area in a sequence that is substantially identical to that used for the recording of data by the reference samples via a coil arrangement including at least one of the first receiving coil and a second receiving coil, and

comparing the measured data with the reference data by an error square minimization to obtain compared data.

15.(Previously Presented) The method as claimed in claim 14, further comprising the act of converting the reference data to characteristics of at least a second receiving coil used for the measuring act.

16.(Previously Presented) The method as claimed in claim 14, further comprising the act of assigning the compared data obtained by the comparing act to a gray value for a pixel to give an image, with the relative pixel intensity representing a degree of the external parameters determined by at least one of the recording act and the at least one of interpolating and extrapolating acts.

17.(Previously Presented) The method as claimed in claim 16, further comprising the act of displaying the image in a merged image.

Claim 18 (Canceled)

19.(Previously Presented) The method as claimed in claim 14, further comprising one of the acts of:

moving the first part-area having the low magnetic field strength by actuating and/or moving the coil arrangement ;

keeping stationary the first part-area having the low magnetic field strength while moving the examination object ; and

moving simultaneously both the examination object and the first part-area relative to one another.

Claims 20-40 (Canceled)

41.(Previously Presented) The method of claim 1, wherein the act of changing the magnetic field strength changes the magnetic field strength temporally in a first frequency band, and the detecting act includes detecting the signal in a second frequency band, the second frequency band including harmonics of signals in the first frequency band.

42.(Previously Presented) The method of claim 1, wherein the act of generating the magnetic field includes the act of first and second magnetic fields which change at different rates and with different amplitudes, wherein the first magnetic field changes slowly in time and with a higher amplitude relative the second magnetic field, and the second magnetic field changes rapidly in time terms and with a lower amplitude relative the first magnetic field.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None